

THURSDAY, JANUARY 22, 1891.

NATURE OF KOCH'S REMEDY.

SINCE Koch announced at the meeting of the International Medical Congress in Berlin, more than five months ago, that he had discovered a remedy for tuberculosis, a lively curiosity has been felt as to the nature of this remedy. This curiosity has now been gratified, and on another page we reproduce the paper in which Koch has explained both the nature of the remedy and the experiments which led him to employ it.

The remedy is a glycerine extract of pure cultivations of tubercle bacilli. It does not appear from Koch's paper what the media were in which the tubercle bacilli were cultivated, and this is a matter of some importance, because it is quite possible that bacilli cultivated in gelatine, in meat broth free from albumen, and in albuminous solutions may yield different products. Thus, Hoffa extracted ptomaines from cultivations of anthrax bacillus grown upon meat, but did not obtain them from the same bacillus when grown upon broth; and Brunton and Macfadyen have found that bacteria appear to have the power of adapting themselves to the soil upon which they grow, by forming such unorganized ferments or enzymes as will decompose it and render it soluble so as to be suitable for their nutrition. Thus certain bacilli when grown upon a starchy soil form an enzyme which will convert the starch into sugar, while the same bacilli grown upon albuminous soil form an enzyme which converts the albumen into peptone.

The quantity of active material produced by the tubercle bacilli is, according to Koch, very small, and he estimates the amount of it in the glycerine extract he employs at fractions of 1 per cent. In its nature it appears to be allied to enzymes and peptones, for, while closely related to albuminous bodies, it does not belong to the group of so-called tox-albumens. Like unorganized ferments or enzymes, and like peptones, it is precipitated by alcohol, but it differs from the former and resembles the latter in its power of rapid diffusion. In addition to this soluble substance, the tubercle bacilli seem to produce another body which adheres closely to them, is not readily removed by solvents, and tends to produce local suppuration when injected under the skin of an animal, while the soluble material which forms the active part of the curative lymph has no such action. Koch has already shown that the tubercle bacillus, unlike the anthrax bacillus, is of a very slow growth, so that when cultivated on a glass covered with coagulated serum ten days elapse from the time of inoculating the slide before the growth of the bacillus becomes at all abundant. A similar condition occurs when the bacillus is inoculated subcutaneously in a healthy guinea-pig. After inoculation the wound generally closes up, and appears to heal entirely within a day or two. In ten to fourteen days afterwards, when the tubercle bacillus has begun to grow, a hard nodule appears, which soon opens and an ulcer forms, lasting until the death of the animal. At the same time as the ulceration begins, the lymphatic glands swell up, the animal becomes emaciated, and death occurs from the lungs and other organs being invaded by the bacilli

which are carried to them by the blood from the point of inoculation. When a similar injection is made in an animal which has been already rendered tuberculous by previous inoculation, instead of no local symptoms appearing at the point of inoculation for ten days, as in the healthy animal, the place where the needle has been introduced appears on the first or second day hard and dark, and this condition spreads a short distance around. The dark colour indicates that the cells of the tissue round the spot of inoculation have become dead, and they are thrown off, leaving an ulcer which heals quickly and completely, and does not infect the neighbouring glands. Koch's further experiments showed that the local ulceration produced in the way just described was not due to living tubercle bacilli, for a similar result was obtained when they had been killed by boiling or by the action of disinfectants. It was therefore clear that the effect was produced by chemical substances, either entering into the composition of the bacilli, or closely associated with them. When pure cultivations of dead bacilli were diluted in water, they produced nothing more than local suppuration in healthy guinea-pigs; but in guinea-pigs already rendered tubercular by previous inoculation a very small quantity was sufficient to produce death, while a still smaller quantity, too small to kill the animal, was sufficient to produce widespread necrosis round the point of inoculation. When still further diluted, the injection of the fluid, so deadly in large doses, becomes salutary; the animals improve in condition, local ulceration diminishes and finally heals up, the swollen glands become smaller, the disease is arrested, and, if not too far gone, the animal recovers. The objection to using diluted cultures of dead tubercle bacilli is that the bodies of the bacilli are not readily absorbed, and give rise to suppuration. The glycerine extract, on the contrary, gives rise to no suppuration, and produces all the general conditions just described as occurring after the injection of the dead bacilli. In Koch's first paper (*vide* NATURE, November 20, 1890, p. 68), he was careful to point out that his remedy would not be of universal application, and said:—"I would earnestly warn people against conventional and indiscriminating application of the remedy in all cases of tuberculosis." He insisted on the fact that his remedy did not kill the tubercle bacillus, but only the tissues in which it was present, and pointed out that in cases where the necrosed tissue could not be removed his remedy was not likely to be of use. But Koch's warnings have been to some extent neglected, and his remedy has been used in unsuitable cases, with the result, as might have been expected, that harm, and in some cases death, has been produced. For example, it has been used in tubercular disease of the membranes of the brain, with the worst possible results.

The remarks of Prof. Virchow, summarized in NATURE of January 15, are probably only the beginning of a flood of unfavourable criticism which will be made upon Koch's remedy during the next few months. During the last month or two unwarranted expectations have been entertained by very many regarding the curative powers of Koch's lymph, and when these hopes are dashed they are likely to be succeeded by equally unwarranted abuse of the remedy.

As we pointed out in our issue of November 20, 1890,

although analogy pointed to cultivations of the tubercle bacillus as being likely to prove preventive or curative in tuberculosis, and although Koch's present paper shows that they are what he has actually employed, still a consideration of the nature of phthisis would lead one to doubt whether these were actually the best adapted for the purpose of curing consumption, and whether we might not yet find cultivations of other disease germs more likely to cure this disease than cultivations of the tubercle bacillus itself. Most of the results which have hitherto been obtained confirm those put forward by Koch in his original paper, and they also show very clearly indeed the necessity for the closest attention to the caution in the use of the remedy which he earnestly enjoined. As a means of diagnosing phthisis in its earliest stages, Koch's lymph is certain to prove a most valuable if not an absolutely infallible means of diagnosis, and will thus ensure proper care in those cases where at present the slightness of the symptoms leads to doubt on the part of the physician, and sometimes to indiscretion on that of the patient. In such cases, as well as in lupus, it is likely to prove a potent curative agent, and to fulfil to a great extent the hopes expressed by Koch himself in the careful and moderate manner which is characteristic of the man. As its failure to effect everything that the public expected becomes generally known, we may expect to hear it even more abused than it has been praised; but it will nevertheless remain a great addition to our power of recognizing and treating consumption, as well as an earnest of yet better things to come.

INDIAN BIRDS.

The Fauna of British India, including Ceylon and Burma. Published under the authority of the Secretary of State for India in Council. Edited by W. T. Blanford. "Birds," Vol. II. By Eugene W. Oates. 8vo, pp. i-x., 1-407. (London: Taylor and Francis, 1890.)

MR. OATES has, for the present, finished his work on Indian Birds, with the present instalment. It is satisfactory to learn, on the one hand, that the Indian Government so highly appreciate his administrative abilities in Burma, that they could not grant him the extra furlough necessary to complete his scientific work, and he was thus forced to terminate his duties in England, to return to his post in the Public Works Department at Tounghoo. It may be India's gain thus to sever him from the work which he so dearly loved and which he has executed with such conspicuous ability, but it will prove a loss to science, and it will be very hard to find anyone capable of continuing the description of the Birds of India in the same complete way that Mr. Oates has done. As the work has been done almost entirely in the writer's private room at the Natural History Museum, he is able to speak with some authority on the subject, and he wishes thus publicly to acknowledge the earnestness with which Mr. Oates wrote his book, the consideration which he showed for the officers of the Zoological Department, and the care which he took of the specimens, numbering many thousands, which passed through his

hands. Curators of Museums will understand what we mean, for there is no part of their duty more irksome than the constant vigilance which is required to supervise the treatment of specimens by students, who seem to be often animated with the sole idea that when they have seen a specimen for their own purposes, it matters little whether the future investigator finds it with its head or wings off, or not. We only wish that every student of birds were endued with the reverent love for a well-prepared specimen which animates Mr. Oates and a few other naturalists we could mention. This by the way.

With the first portion of the second volume of the "Birds," Mr. Oates completes his account of the Passeres or Perching Birds of the British Asian Empire. Following out his ideas of classification, he first describes the Flycatchers and Thrushes, and follows them with the Dippers and Accentors. Then come the Weaver Birds and Finches, Swallows, Wagtails, Larks, ending with the Sun-birds, Flower-peckers, and, of course, finally with the Ant-thrushes or Pittidæ. No one will find fault with the position of the latter; but we greatly question the natural sequence of the other families. No one can doubt that Mr. Oates, in his classification of the Passeres, the most difficult of all ornithological problems, has advanced our knowledge of the characters of differentiation, but we must demur to some of his conclusions. However, here is a genuine piece of work, with chapter and verse for every one of the author's opinions, and we will therefore append a succinct account of the new facts brought forward by the author, and give a practical aspect to the present review.

Fam. MUSCICAPIDÆ.

Muscicapa parva is a *Siphia*. Oates, *t.c.*, p. 9. [This is an innovation, to be accepted with caution, for it introduces *Siphia*, hitherto an Indian genus, into the Palearctic Region.]

Muscicapa albicilla is a *Siphia*. Oates, *t.c.*, p. 10. [This follows as a matter of course, as the species is the Eastern representative of *M. parva*.]

Muscicapa hyperythra is a *Siphia*. Oates, *t.c.*, p. 10. [So Cabanis was right, according to Mr. Oates, in describing this bird as a *Siphia*.]

Cyornis should be separated from *Siphia*, and not united to it, as has been done by Sharpe, as there is blue in the plumage. Ergo, *Muscitrea cyanea* is a *Cyornis*. Oates, *t.c.*, p. 13. [This is an aggregation of species, which we do not think will be ratified.]

Poliomyias hodgsoni (Verr.) apud Sharpe, is a *Cyornis*. Oates, *t.c.*, p. 14.

Muscicapula hyperythra (Blyth) apud Sharpe, is a *Cyornis*. Oates, *t.c.*, p. 15.

Digenea leucomelanura (Hodgs.) apud Sharpe, is a *Cyornis*, Oates, *t.c.* p. 16.

Muscicapula superciliaris (Jerd.), apud Sharpe, is a *Cyornis*. Oates, *t.c.*, p. 17.

M. melanoleuca, Blyth (*M. maculata*, Tickell, apud Sharpe) is a *Cyornis*. Oates, *t.c.*, p. 18.

M. astigma (Hodgs.) and *M. sapphira* (Tick.) apud Sharpe, belong to *Cyornis*. Oates, *t.c.*, pp. 19, 20.

Niltava oatesi (Salvad.), is a *Cyornis*. Oates, *t.c.*, p. 21.

Siphia pallidipes (Jerd.) and *S. unicolor* (Blyth) apud Sharpe, belong to *Cyornis*. Oates, *t.c.*, pp. 22, 23.

Muscitrea grisola (Blyth) is a Flycatcher, not a Shrike. Oates, *t.c.*, p. 31.

Cyornis poliogenys, Brooks, and *C. olivacea*, Hume, belong to the genus *Anthipes*. Oates, *t.c.*, pp. 33, 34.